

**PODIOMITRA, A NEW GENUS OF HOMALOMITRINAE (DIPTERA:  
SPHAEROCERIDAE) FROM COSTA RICA**

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**Abstract.**—*Podiomitra ostracotarsata*, new genus and species, is described in the rare and poorly known subfamily Homalomitrinae (Sphaeroceridae). This fully-winged, but apparently flightless, species was collected in a Malaise trap in Costa Rica, probably in association with a winged army ant.

**Key Words:** Sphaeroceridae, Homalomitrinae, army ants, *Podiomitra*

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The subfamily Homalomitrinae was described by Roháček and Marshall (1998) for a group of five extremely rare, bizarre-looking species with reduced wing venation, an enlarged and flattened head, no ocelli, reduced chaetotaxy, and greatly enlarged legs with all tarsomeres swollen and with the apical tarsomere deeply excavated. We here report the discovery of yet another highly distinctive genus in this enigmatic, isolated subfamily.

***Podiomitra* Marshall and Roháček,  
new genus**

Type species.—*Podiomitra ostracotarsata* Marshall and Roháček, new species.

Generic diagnosis.—The following characters distinguish *Podiomitra* from other homalomitrinines: Antennae (Figs. 5, 6) distinctly separated, scape small, pedicel markedly tapered basally. Frons strongly differentiated into a prominent anterior portion and a medially flat upper portion (Fig. 5). Prosternum with setulae. Mesoscutum short, with only small setulae other than prescutellar dorsocentral setae; scutellum with 2 pairs of marginal scutellar setae (and a pair of minute setulae on disc), the apical

pair long (Fig. 5). Anepisternum with only uniformly small setulae, katapisternal setae also reduced. Metapleuron with a single seta between base of halter and hind coxa (Fig. 1). Wings (Figs. 3, 4) with no venation beyond basal fifth; venation in basal fifth relatively complete but all veins very shortened (including C and R veins); cell br absent; M basally weakly sclerotized and fused to R4+5, apically tapered and reduced to fold beyond dm-cu; cell dm short, with rounded posterior apical corner; cross-vein r-m fused to basal part of M. Legs stout and long (Fig. 1), distal tarsomeres distally divided into anterior and posterior valves, claws arising in a dorsal position deep between the valves (Fig. 2). Abdomen with poorly sclerotized terga and sterna, and with very long and dense setae on terga, sterna and wrinkled pleural membrane (Figs. 8, 9). T7 expanded onto ventral side, posteriorly tapered, with a number of cup-like sensilla at anterior margin; S7 narrow; T8 and S8 short, the former transverse, the later posteromedially incised, both covered by micropubescence.

Etymology.—The generic name *Podiomitra* refers to the podium like frons.

*Podiomitra ostracotarsata* Marshall and  
Roháček, new species

(Figs. 1–9)

Species diagnosis.—Head brown, body otherwise pale yellow. Head as broad as thorax, lower frons strongly elevated and projecting anteriorly, upper frons depressed, broad and flat, ocellar triangle absent. Palpus barely visible in type, but apparently well developed and setose. Mesoscutum with uniformly small setulae except for a pair of posterior dorsocentral setae lying flat against upper surface of scutellum. Abdomen long-setose. Wing veins compressed into basal fifth of wing but relatively complete, R4+5 and costa forming a loop, r-m reduced, and dm-cu present. Costagial seta absent, but costa densely setose, distal setae conspicuously long.

Description.—*Holotype female*: Body length 1.6 mm. Body and legs pale, head brown. Head (Figs. 5, 6) as broad as thorax, frons and upper part of face strongly projecting anteriorly; eye restricted to posterior half of head, with relatively few (about 70), large facets, finely setulose. Gena broad, flat on lower half, with two, thin subequal setae on vibrissal angle. Postgena with expanded posteroventral corner (Fig. 1). Epistoma large but not depressed or delineated by a shelf. Antennae narrowly but distinctly separated, scape short but almost contiguous and apparently fused with intervening lunule (Fig. 6); pedicel very narrow basally; first flagellomere densely long setulose distally; arista long haired, white, slightly longer than head width. Frons (Fig. 5) with narrow, densely setulose orbital strips; a broad, flat upper frons surrounded by a silvery micropubescent stripe; and a prominent, shelllike lower frons with 6–7 small, inclinate interfrontal setae and a flat, densely microsetulose upper surface. Upper back of head setulose, outer vertical setae slightly longer than surrounding setulae, other setae indistinguishable. Ocelli and ocellar triangle absent.

Prosternum membranous, with four small

setae. Mesoscutum (Fig. 5) with small setulae, uniformly distributed laterally and posteriorly, medially mainly restricted to 3 darker pigmented longitudinal stripes, and with a single pair of dorsocentral setae lying flat over the scutellum. Scutellum with large apical setae, minute lateral setae and a single pair of small discal setae. Anepisternum (Fig. 1) with only small setulae but densely setulose on anterior half; metapleuron with a single seta between base of halter and base of leg. Wing (Figs. 3, 4) with C restricted to basal fifth of wing. C (especially distally) and terminal portion of R1 with long setae. Sc almost invisible; R2+3 and R4+5 very short; R4+5 curved back to join costa in a continuous loop bisected by R2+3. Cell br absent (reduced because M is basally closely attached or fused to R4+5) and M apically tapered and reduced to foldlike structure beyond dm-cu; cell dm distinct though short, with rounded posterior outer corner; crossvein r-m attached to M, dm-cu and CuA1 distinct; A1 short, basally darkly pigmented, apically tapered. Anterior margin of wing beyond costa somewhat secondarily thickened and finely pubescent in contrast to posterior margin, which has a fringe of long hairs. Alula reduced, inconspicuous. Halter long, white; knob very large (collapsed and flat on type).

Legs (Fig. 1) long and thick, not flattened, uniformly covered with short setulae, only mid tibia with a small apicoventral bristle; all tarsomeres thickened, first, second and fifth tarsomeres of hind leg equal in length, third and fourth shorter and each with a small, dark microsetulose patch apicoventrally; apex of all tarsi valvelike, claws displaced to dorsal position and inserted between lateral valves, pulvilli facing each other within valvelike tarsal apex (Fig. 2).

Abdomen with very weakly sclerotized terga and sterna, all whitish yellow, densely and long setose, with longest setae inserted on darkened patches (Figs. 8, 9). T1+2 long but dorsomedially basally desclero-

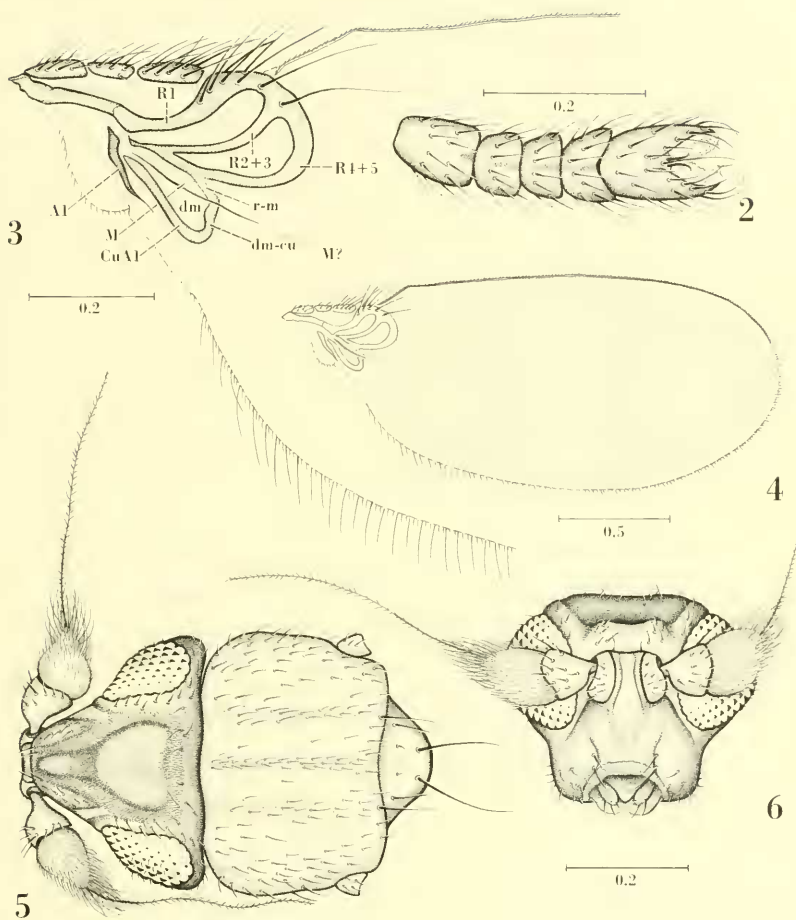


Fig. 1. *Podiomitra ostracotarsata*, female holotype. Wing reconstructed according to slide mounted right wing. Scale bar = 0.5 mm.

tized and with setae concentrated along posterior margin. T3–T6 slightly transverse, with very long setae, particularly at posterior margin; long dense setae also inserted on wrinkled dilatable pleural membrane. S2–S6 narrower than associated terga, about as long as broad, with long setae at lateral margins, medial setae short (Fig. 9).

Postabdomen (Figs 8, 9). T6 and S6 sim-

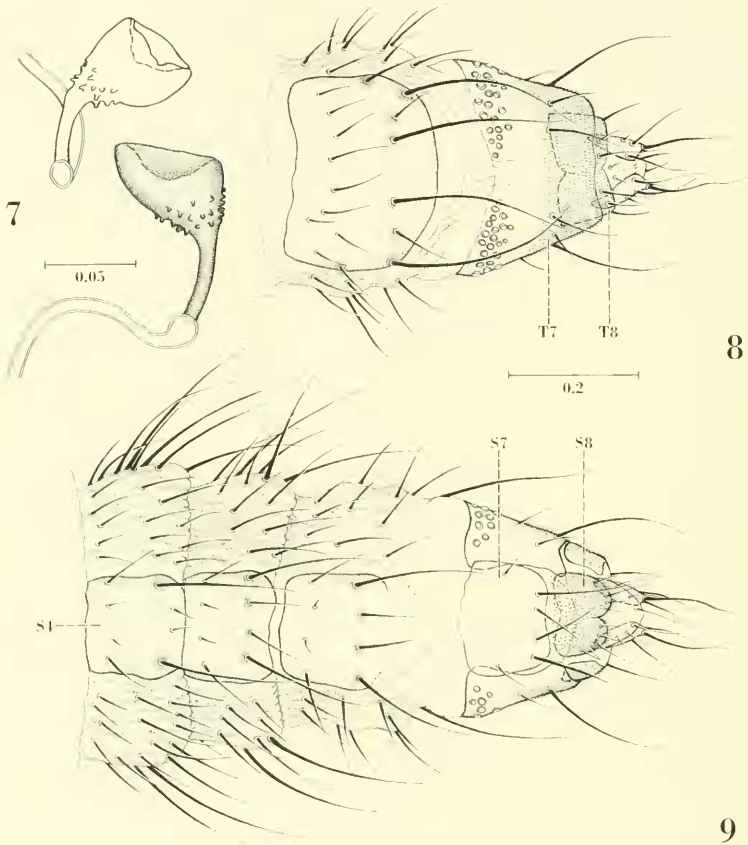
ilar to those of preceding segment, including chaetotaxy. T7 dissimilar to all other homalomitridines, large, expanded lateroventrally forming an incomplete posteriorly conical ring, with long setae inserted in the middle of lateral margins and with peculiar dish-shaped sensilla clustered at anterior margin. S7 rounded trapezoidal, as broad as S6, with 2 pairs of long setae posteriorly.



Figs. 2-6. *Podiomitra ostracotarsata*, female holotype. 2, Mid tarsus dorsally. 3, Detail of wing venation. 4, Right wing. 5, Head and Mesoscutum dorsally. 6, Head frontally. Scale bars: Fig. 4 = 0.5 mm, others = 0.2 mm. Abbreviations: A1—anal vein, CuA1—cubitus, dm—discal medial cell, dm-cu—discal medial-cubital (= posterior) cross-vein, M—media, R1, R2+3, R4+5—1st, 2nd, 3rd branch of radius; r-m—radial-medial cross-vein.

T8 short, transverse, with small anteromedial incision and moderate setae at posterior margin; completely micropubescent as is posterior half of T7. S8 narrower than T8.

with distinct posteromedial incision, hence posterior margin bilobate, all micropubescent, with fine setae posterolaterally. Spermathecae (Fig. 7) 1+1 blackish, with cup-



Figs. 7-9. *Podiomitra ostracotarsata*, female holotype. 7, Spermathecae. 8, Postabdomen dorsally. 9, postabdomen (plus abdominal segments 4-5) ventrally. Scale bars: Fig. 7 = 0.05 mm, others = 0.2 mm. Abbreviations: T—tergum, S—sternum.

like body proximally covered by a number of tubercles and completely fused (no boundary visible) with sclerotized part of spermathecal duct (as in *Sphaeromitra*). T10 subtriangular, almost unpigmented, bare except for a pair of small medial setae. S10 larger than T10, subcircular, with short marginal setae, the posteromedial pair longest. Cercus (like T10 and S10) without mi-

cropubescence, with long, moderately sinuate apical, dorsopreapical and lateral preapical setae (Fig. 8).

Type material.—Holotype ♀: COSTA RICA, Prov. Cartago, La Represa, Torre del I.C.E., entre Porras y Villegas. [hydro-electric tower between Porras and Villegas] 1800m. ABR 1997. R. Delgado. Malaise L\_N\_186150\_560100. INBio collection

#46783. Left wing with broken apical half, right (complete) wing removed and mounted on a microslide pinned below specimen. Abdomen detached, cleared and put in tube with glycerine also pinned below specimen. An unidentified mite is attached between the thorax and the ventral side of the abdomen.

**Etymology.**—The specific epithet *ostracotarsata* refers to the shell-like formation of the tarsal apex.

**Relationships.**—Although there is no doubt about the inclusion of *Podiomitra ostracotarsata* in the Homalomitrinae, it is not obviously more closely related to either one of the described genera in the subfamily, nor do the other two genera form a well-supported clade excluding *Podiomitra*.

*Podiomitra ostracotarsata* superficially resembles *Sphaeromitra* Roháček and Marshall in the size and shape of the eye, the short scape, and the extremely reduced wing venation, but only one of the eight putative synapomorphies listed by Roháček and Marshall (1998) for the genus *Sphaeromitra* (reduction of mesonotal chaetotaxy) could apply to *Podiomitra*, and this character differs in detail between the two genera. *Sphaeromitra* has only small setulae on both the scutum and scutellum; *Podiomitra* has distinct prescutellar dorsocentral setae and well-developed scutellar setae. Other possible synapomorphies of *Sphaeromitra* and *Podiomitra* include the postgena with expanded posteroventral corner, discal scutellar setulae (although there is only 1 pair in *Podiomitra*), shortened R2+3, and female abdominal sternite 7 smaller than tergite 7.

*Podiomitra* is superficially very different from *Homalomitra* Morgués-Schurter in wing development, head shape and chaetotaxy, but both genera share the plesiomorphic retention of crossvein dm-cu. Of the eight putative generic apomorphies listed by Roháček and Marshall (1998) for *Homalomitra*, two might be shared with *Podiomitra*. Both genera have a long fringe of fine setae along the posterior margin of

the hind wing, and both genera have the antennae narrowly separated. The latter character, however, is more marked in *Homalomitra* and is accentuated by the greatly enlarged scape, as a result of which the *Homalomitra* looks very different from the other genera.

Possible synapomorphies linking the other homalomitrine genera (*Sphaeromitra* and *Homalomitra*) to the exclusion of *Podiomitra* include the strongly flattened legs and enlarged scape.

Although more putative synapomorphies (5) support a sister group relationship between *Sphaeromitra* and *Podiomitra* than other resolutions to this three taxon set (2 synapomorphies per alternative clade), some of the characters are of uncertain homology and polarity, and more material including male specimens is needed to resolve the generic relationships of the Homalomitrinae.

**Discussion.**—This remarkable subfamily is known from a very few specimens collected at scattered localities from throughout the Neotropical Region. Although most specimens are from Malaise traps, the modified legs, reduced thorax, and weakened wings of *Sphaeromitra* and *Homalomitra* led Roháček and Marshall (1998) to speculate that they might get around by phoresy rather than flight. Some specimens have been collected in association with ecitonine ants, so our best guess is that homalomitrids develop in ant kitchen middens, and move from nest to nest by phoresy. The discovery of the new species described here, in which the wing is reduced to a thin, veinless membrane over its distal  $\frac{1}{3}$ , further suggests that these flies are phoretic. All homalomitrids have a pocket or cleft at the apex of the tarsus, but this feature is especially conspicuous in *Podiomitra ostracotarsata*, in which the apex of the tarsus is split into anterior and posterior halves, each half lined by a pulvillus that has rotated 90 degrees from its usual position, one facing forward and one facing backward. The claws are reduced and in a dorsal position

deep in the cleft. The apical structure of each tarsomere is thus clearly modified for grasping something between its valvelike halves.

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#### LITERATURE CITED

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